

## II.—THE FIRST STEAM ENGINES IN THE DURHAM COALFIELD.

BY EDWARD HUGHES.

Before the war an eminent physicist asked me why Newcomen's steam engine was not more extensively used in industry, particularly in coal mining. Evidence has since come to light which provides part of the answer. Two patents for so-called steam engines were granted in 1698, one to John Yarnold, already described in these Proceedings, and the more famous one to Thomas Savery. The latter invention was described as "for raising water and occasioning motion of all sorts of mill work by the impellant force of fire." A year later, Savery, having exhibited a model of his engine in the House of Commons, was granted an extension of the patent for twenty-one years and it was confirmed by act of Parliament. Newcomen's invention came in the next decade, but the precise relationship of the one to the other and to earlier claimants has never been satisfactorily settled.<sup>1</sup>

The first thirty years of the eighteenth century in this country witnessed feverish scientific experimentation which eventually laid the ground work for the Industrial Revolution and, given better fortune, might well have precipitated that change by a generation or more. The Government not only stimulated experiment by the grant of numerous patents but actually helped to finance certain undertakings by grants out of Secret Service monies. Thus, in 1718, Jonah Crabhorn was granted £20 to enable him to try an

<sup>1</sup> See the important articles in the *D.N.B.* on Newcomen, Papin and Savery.

invention for improvement of navigation; in 1729 John Allen, "Doctor in Physick," obtained a patent for his invention for driving ships by steam. The full citation reads as follows . . . "the said John Allen hath by repeated experiments found out and brought to perfection a new method of heating and boiling water . . . of great service in the working of engines for raising of water by fire, very useful in brewing and distilling and other trades, and has also discovered a new invention for the application of certain powers (never before made use of for the like purposes) to give motion to engines, whereby a ship may be navigated in a calm, from whence innumerable advantages may accrue in sailing and of great use in the draining of mines and for drying malt."<sup>2</sup> In the following year Joseph Willis received £500 towards the expense of "a public trial of making iron in air furnaces with pit coal."<sup>3</sup> Many people were interested in an improved steam engine—the London Fire Insurance companies, such as the Sun Fire Office, "New River" companies concerned in the water supply of expanding urban communities, and most urgently, perhaps, the proprietors of collieries.

At the beginning of the eighteenth century a crucial stage had been reached in the Tyne coalfield. The Grand Lease of the coal measures in the manors of Gateshead and Whickham had expired in 1681. The relatively shallow seams in these manors—the scene of the greatest expansion in the previous century—were now practically worked out. This can be proved conclusively by the yearly output figures of the dozen or more sub-lessees in each of these manors from 1696 to 1710: in the former year the figure for Gateshead was 886 tens and for Whickham 1,147 tens, the corresponding figures for 1710 being 727 and 673. In 1735 Thomas Sisson, steward of the manor of Gateshead, added this note in his rental, "the same [a sum of £22 6s. for the town itself] is very ill paid by reason the coal trade is

<sup>2</sup> Additional MSS. (British Museum), 36123, §120.

<sup>3</sup> Treasury Paper (P.R.O.), T38, 234-5.

almost quite gone from Gateshead, though the houses we have are generally tenanted they are by such as are not able to pay their rents.”<sup>4</sup> Gateshead was already becoming a depressed area. The industry was moving to the west, notably up the Derwent valley, and to the south, to Team, Eighton. (North of the river there was a comparable development from Heaton to Longbenton.) It is perhaps significant that by the middle of the century the highest priced coals in the London market were Tanfield Moor, Byker, Pontops and Longbenton.<sup>5</sup> The rise of the “western” collieries raised in acute form the question of staith room for the keels—the shipping season was still confined to the summer months—and the vexed question of wayleave over the lands of freeholders and customary tenants. When a wayleave bill was before Parliament in 1711 Alderman Matthew White, the proprietor of Jesmond colliery, seriously proposed a clause “that all coal owners in these parts may have the liberty of impressing waggons, wains or carts to bring down their coals, paying for every load drawn by a single horse a penny a mile and so in proportion for horses or oxen.” Far-seeing proprietors on both sides of the Tyne knew well enough that deeper seams existed in the honeycombed lands nearer the river, but as yet all attempts to win them, e.g. at the Park [Gateshead] and at Heaton had failed. Both of these were known to be “water collieries.”

Hitherto, the problem of draining pits had been solved by driving “levels” from the shaft, assisted, in places, by horse “ginns.” It seems likely that windmills were also used. George Mowbray, the owner of Double Dykes, had “a wind engine” and “a horse ginn” at his colliery in 1738. Windmills appear in the immediate foreground in the map in Bourne’s *History of Newcastle* (1736) and in Bailey’s “view” which forms the frontispiece to Brand, volume II. But beyond a certain depth, these devices failed to answer: hence the need for a workable steam engine.

<sup>4</sup> *Cotesworth MSS.*

<sup>5</sup> Additional MSS., 38331, §121.

In April 1715, a certain Stonier Parrott, a North Staffordshire man, addressed the following letter to Captain George Liddell of Ravensworth :

HALIFAX.

Since we find disappointments much contrary to expectation and rather than make a fruitless journey to a place where we had formerly promised ourselves considerable encouragements for erecting Engines, if you'll please to favour us with a line directed as below to assure us that you are minded, we shall set you up an engine. We will leave the terms to you and come down this summer purposely to serve you how little sooner we get by it. Mr. Sparrow joins with me in service to you and brother.

"Direct to me Stonier Parrott of Bignall Hill, near Newcastle-under-Lyme. Stone Bag. By way of London."

The "we" referred to in the letter was the said Mr. Sparrow of Chesterton, Staffs, which adjoins Bignall Hill, and Richard Parrott, father of the aforesaid Stonier.<sup>6</sup> These Staffordshire birds were to prove strange cuckoos in the nest. From another letter it is clear that they were already known to William Cotesworth, prospective lord of the manor of Gateshead, who as the paid secretary of a powerful coal cartel had been on frequent errands to London in recent years. Before the year 1715 was out, Liddell, Cotesworth and Francis Baker had signed articles of partnership with the "Fire Engineers" on the following terms :

- (i) The Fire Engineers were to supply a steam engine capable of raising 200 hogsheads of water per hour "fifty yards deep below the water level" at an annual rent of £300 "and so in proportion for more water or greater depth."
- (ii) There was to be a joint lease of Park Colliery, Liddell, Cotesworth and Baker each holding a one-fifth share and the "engineers" the remaining two-fifths, the charges of working the pit to be borne proportionably.

<sup>6</sup> See Richard Parrott's "*Account . . . of the several estates in the parish of Audley, 1733*," in Staffordshire Record Society's Publications, 1944. Bignall Hill is in Audley parish.

- (iii) The proprietors undertook to sink two "old" pits to a greater depth and to drive a drift at a certain level, after which the "engineers" undertook "to begin to draw water and sink the said pits to the main coal seam and to take up the coal in the way to the thill."
- (iv) If, for any reason, the proprietors "cannot effectually sink the said pits or finish the drift," they were to assign their whole interest in the colliery to the engineers.
- (v) "And in case they [the engineers] cannot free the said colliery from water, but that all their attempts and inventions shall be ineffectual," they undertook fully to reimburse the proprietors and to assign their share over to them.

Other articles provided for the use of staithes, etc., and for an equal partnership in "all new collieries, *except one*, that shall be taken on Tyne or Wear." The exception is significant. Captain Liddell subsequently claimed that this partnership at Park Colliery contemplated the first steam engine to be erected "in these parts," but this was not strictly correct. The following letter from Henry Lambton, dated 8th June, 1716, and addressed to Stonier Parrott "at Mr. Armstrong's at the signe of the St. George in Gateshead" provides a further clue.

DURHAM.

The Partners at Biddick all liklyhood will come to agreement for I am assured from Mr. Wright and Mr. Spearman that Mr. Peareth will comply offhand to my proposals, so that there is but one eighth can stand out and I am sure if the other(s) do, he must comply. I send this only lest you should imagine me negligent. I hope in a little time to find measures to see you: in the meantime beg leave to subscribe myself your real friend and humble servant.

P.S. Sir, I beg you will keep your being concerned with me as secret as possible for I am in hopes to get it not much above £600 per an.: however to push it as far as I can, but I think it will do.

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Clearly, by this date, Lambton and certain proprietors at Biddick were also in negotiation with the same engineers, and later evidence suggests that the first consignment of engine parts was sent to a colliery at Washington and not to Gateshead Park.

A further and more baffling stage was reached a year later.

Ravensworth Castle,

November ye 14th, 1717.

Sir;

Being informed you are one of the chief proprietors in the fire engine occasions you this trouble. I am concerned in partnership in a colliery called Farnacres which is of an inferior nature, none of that coal being fit for the London market but must be sold into forreigne parts, the best of them, and those that are sold must be sold at half-price to the [salt] pans in this neighbourhood, so that we can neither sell any considerable quantity nor can we sell at any price that will give tolerable profit. This is the true state of the case I do assure you.

In this colliery I have sunk one pit to the thill at the bottom of the coal which is about 25 or 26 fathom below the levell, the levell the water goes away at, and the level is 6 fathom below the surface of the earth. We sunk another within about 3 yards of the same coal but finding water cast to about 80 hogsheads per hour which was more than we could afford to draw with horses, we gave over and resolve (in case you Gentlemen will encourage us) to set up an Engine; but as she is an inferior colliery, that is, as the coals wrought in her will not sell for above  $7^s/6^d$  per chaldron one with another, [and] as the quantity we can sell will scarce be above 7 or 8000 chaldrons a year, whereas in a good one we may sell at 11/s or 12/s per ch and do sell above 30000 cha. I say, these things considered, we cannot afford a great price. However, as I have an inclination to deal with you, I will make a proposal.

That I will at our own charge pay for all the materials for an Engine that will cast 200 hogsheads of water an hour, the Company to furnish me with the materials *bona-fide* at the same prices they themselves pay and to find me one of your agents to set up the Engine etc and to work it till my servants shall be able to do it themselves for which a price certain may be set.

I will pay to the proprietors of the Engine £150 per ann from the time it shall begin to work for a term certain which shall be 14 years. The rent to cease on an overcharge of water, when it

shall be more than the Engine can draw or in case of sylth, fire, Civil Wars, etc. by which obstructions the Colliery cannot work. These articles are what are in all Colliery leases and are what cannot be objected against.

In case this Colliery should by any accident fail, then to have a liberty to remove the Engine to any other Colliery.

The reason why I mention so large an Engine is not that I expect ever to have 120 [hogsheads] but in case it [the water] should encrease, then the charge of altering our Engine would not only be expensive but a great loss of time which would be of ill consequence.

We hope you'll think this proposal reasonable being we are desirous of retrieving the money we have already spent upon her and have offer'd as high as we can go. You'll also consider that we think we may claim as much of your favours as anybody being *we were the first that agreed for an Engine in these parts viz.,* for the Parke Colliery and not only so but hope to have occasion for some more if we succeed.

This I will promise you that we shall punctually comply with whatever we covenant for which I doubt you will find some that have engaged with you in a neighbouring County will not be able to do.

I desire you'll send me down the plan of your Engine and also an account what you reckon an Engine of the size I propose will cost; and that you'll be so kind as to let one your Operators send me an account of all the materials that will be wanting and which are to be provided in this Country with the dimensions of the house. An answer as soon as you can will much oblige.

Your unknown but faithfull servant  
GEO LIDDELL.

To Mr John Meres  
at Apothecary's Hall in  
Blackfryers.  
London.

Who was this Mr. John Meres and what was "the Company" he represented? It is clear that he was a higher authority in the control of the patent rights of the steam engine than the Staffordshire men. The York Buildings Company with which he was associated had a working steam engine, a famous sight for visitors to London, and the company was interested in other things, e.g., it speculated heavily in Forfeited Estates of Scottish Jacobites after

the 'Fifteen.<sup>7</sup> Not all its activities have yet been uncovered.

Meres lost no time in replying to Liddell. His "Committee" were prepared to accept the proposed terms "knowing that we have a gentleman to deal with," save that it objected to the proposal to allow the proprietor to remove the engine to another pit. The letter continued: "we hope we shall have a barrell [i.e. a cylinder] and boiler for you in a short time, having some coming round from Cornwall which will fit your purpose and if so, in case the house and pits were prepared, yours may be the first Engine set up at Newcastle. The charge of the Engine of the size you mention will be about £250, besides the house, pipes etc. As to the house, there being one built at the Park, as we are informed, the dimensions thereof and the timbers will serve for your workmen's instruction save that it need not be built for two engines, as I hear that is. We have not at present any person at liberty whom we can trust to serve you, but in a short time shall send you one of our best hands. As to the elm pipes, I perceive by Mr. Parrot that you have not trees of sufficient largeness to bear a nine inch bore and therefore it will be necessary to consider whether it may not be for your advantage to have them prepared here and sent by sea as he intends his. The lower trees must be at least 16 inches square. The other matters you propose we agree to save as to removing the Engine which cannot be without our consent for otherwise the Engine may in a short time be removed to a Colliery of much greater value. I hope in ten days to send you a draft of articles."

Acknowledging this letter on December 6th, Liddell added that he had arranged with Mr. Cotesworth, "who is one of the partners . . . now in London," to try to reach a compromise on the question of removing the engine. "To have a liberty to remove to any colliery without limitation in case this fails, is what we cannot expect without

<sup>7</sup> David Murray, *The York Buildings Company—a chapter in Scottish History*, 1883, p. 53.



some advances in rent and yet, on the other hand, not to have a liberty without your consent is in reality allowing us no liberty at all but laying us at your mercy intyrelly." He stated that the partners would have spent between three and four thousand pounds on this colliery, so he asked Meres not to be "hard upon bold undertakers." Finally, he acknowledged a "draught" of the engine "but wants a key to explain it."

A week later, Cotesworth, having seen Parrott and Meres in London, reported further to Liddell. Parrott had told him that he had a copper boiler "that cost him £150 coming from Wailes which they intend for us," adding that he had made one "of saltpan plates of the same dimensions for about £37 which he is positive from experience will do much more service." "He [i.e. Parrott] is very friendly," added Cotesworth, "and I hope will act ye part of a fair man"; indeed that morning he had made "a full discovery" to him. From this it transpired (i) that Parrott had now secured Beighton's share in Heaton colliery, (ii) that Mr. Ridley was "very solicitous to bring him into measures" for an engine for Walker colliery, (iii) that Ridley had previously treated with the said Beighton for his engine at Newcastle and offered £350 per an. clear, but Beighton had stood out for a higher rent, (iv) that Parrott "stands off and has interrupted as much as he can Ridley's agreeing with the [Fire] Committee," though he had agreed with Sir H. Lawson for the supply of an engine. "I laid the circumstances of the affair clearly before Mr. Thompson and Meres," Cotesworth concluded, "and they expressed themselves very favourably towards us on account of ye encouragement we gave ye Engine at the Parke and have promised me all the encouragement they can give us."

This "discovery" illustrates the secretive ramifications of the Fire Engineers' business, and other evidence is forthcoming of their widespread activities. For example, in May, 1716, Lord Molyneux leased his coalmines in Torbuck, Lancashire, to George Salt and Stanniere Parrott for twenty-

one years, "paying unto me two shillings for every work of coals or canell that shall be got in the said mines and the sixth part of the money that any stock shall be sold for there."<sup>8</sup> Colliery proprietors in Scotland and in several English counties had signed articles of agreement, all apparently involving the payment of a high rent to the patentees besides admitting them to partnership. But, if the experience at Gateshead is any guide, the patentees were painfully slow in fulfilling their part of the bargain.

In February, 1718, Meres informed Cotesworth that he had an iron cylinder, twenty inches in diameter, but he feared that it or even a 22 inch one "will be too little for the work." "Therefore, if one of 24 inches will be sufficient you may have one that is now ready at Bromsgrove, otherwise it will be about six months before an iron one of that dimension can be had." He pointed out that there was an appreciable difference in price between an iron cylinder and one of "pot-mettle," the iron would cost 36s. per cwt., the pot-mettle 1s. 4d. per lb., "but then the iron is liable to more accidents and, if broke, is worth nothing," whereas the pot-mettle would fetch eightpence a lb. as scrap; "besides if the water should have any great vitriollic quality the iron will be of no use." He was "sorry to hear there is so little progress made at the Park—and the more so for that I find the difficulty does not lye so much in the nature of the work as in the [attitude?] of some I hoped better from and shall not fail to remind of their and our interest in this case." Was Parrott trying to double-cross Cotesworth? Later in the year it was reported that "Mr. Parrott had a man come on purpose to make a boiler for the Park and was in hopes you would then have provided a boiler for Farnaces." "We design the twenty-two inch cylinder for you that is now at Washington at the price we paid for it viz. 1s. 4d. per lb.," added Meres.

The following year saw little further progress. In the summer a 22 inch cylinder arrived at Newcastle, but Meres

<sup>8</sup> *Lancashire Papist Estates* (ed. R. Sharpe France), vol. 1, p. 195.

promptly pointed out that it was "ingaged and can't let you have it"; there was another ready at Bromsgrove with delivery in approximately two months. "I am sorry Mr. Sparrow hath given occasion for so great a breath and complaint as I perceive you justly have," wrote Meres, "and shall indeavour to persuade Mr. Parrat to meet us with you that, if possible, he may give satisfaction." "Poor Mr. Lambton's case is what I am extremely concerned at but hope none can impute to the Engin what seems to be only his want of estate (at least what he is pleased to dispose on this way) from compleating." Lambton had evidently thrown in his hand. That an engine had been partly erected at his colliery seems to be clear from this letter and from the presence of a redundant cylinder at Washington. The proprietors at Farnacres and the Parke were as yet not fully undeceived.

Early in April, 1721, Liddell openly accused Meres of obstructing the erection of an engine at Farnacres, to which Meres replied: "We have been informed by different people that the situation was such as would with more than common probability drain diverse adjacent lands [but] you are not pleased to give the same security by covenants as other Gents have done and yet require a larger cylinder, the dimensions of which is the only method we have hitherto conceived can obviate that difficulty." It was in vain that Liddell proposed, through Cotesworth, to make affidavits from time to time as to the quantity of water drawn and to satisfy the patentees accordingly. "I hinted that in case you would allow us what [is] paid at Elswick,<sup>9</sup> or something less, we would immediately agree," added Meres, though he vigorously denied that his Committee had been partial and charged a higher rent for their engines in some places than in others.

By 1722 Liddell's patience was exhausted and steps were taken "such as we may safely quit him upon . . . for the delay is entirely owing to them." "Whatever terms you

<sup>9</sup> Edward Wortley's colliery.

think it for our interest to agree to," he told Cotesworth, "I shall readily agree to provided we may but be quit of them entirely for I desire no such partners." He now hoped, he added whimsically, to keep these Staffordshire men "at Staff's end." He was "very uneasy to have two, so hopeful collieries lying unwrought and so much money out of pocket and not through any fault on our side." In 1723, Mr. Brandling, proprietor of Fellon colliery, brought an action against Parrott for recovery of rent. In the following summer, Liddell and Cotesworth decided to send Mr. John Airey, an assistant of George Grey, a Newcastle attorney, to North Staffordshire with peremptory instructions and a threat of legal proceedings. After reciting the 1715 agreement, the letter continued, "We have, several years ago, as you very well know, performed our part of the said agreement in making and securing the said drift and ridding, sinking, and timbering both the said pits . . . and yet you have scarce made an attempt to sink the said two old pits though you had no obstruction to hinder or prevent you by any quantity of water and you have a great many times been requested to do it." "Further we have, also, pursuant to the said article, several years ago, as you also well know, taken to farm Heaton Colliery and have actually paid above twenty-four hundred pounds reserved rent for the same and have been at the expense of a Chancery suit to settle one of these leases with Robert Midford which is not yet ended. And we have been at a very great charge in endeavouring to get wayleave to the River Tyne for the said Heaton Colliery, also in endeavouring to win the same." An expense of over £2,000 had been incurred at this colliery since 1717 "upon the assurances you gave us of the great things you were able to do with your fire engines . . . and we are now and have long been at a full stand for want of that assistance you ought to give us." Airey was privately instructed to inquire whether Stonier Parrott "will be a plaintiff with us in this suit against Sparrow" on whom the whole blame was laid. The Durham gentry never

completely lost faith in Parrott himself. Airey returned with a peace offering of £100, but this was not enough to prevent legal proceedings against "the knave" Sparrow at York a year later.

Meanwhile Parrott had decided to blow the gaff and to call in question the whole basis of the patent. In a letter from Coventry in December, 1725, he declared "I do assure you I have so far pressed your affairs and some of the members of the Committee have been unreasonably obstinate in opposing them, that it has moved my resentment pretty much since Mr. Meres went abroad, insomuch as I have took pains to find you out a way of redress, I hope much more to your advantage." He now proposed to promote a petition to parliament for the repeal of "the Fire Engine Act," i.e. the patent of 1698. He had already spoken to "Several of our Members hereabouts and undertook to procure you a petition with a thousand hands from this Corporation (Coventry), but also from Newcastle-under-line, Wolverhampton, Birmingham and some other places if necessary and will bring in a Bill at the same time in behalf of Sir Richard Newdigate and others in these parts."<sup>10</sup> And for the expense of £30 or £40 in this way I give you my neck if you have not the use of the three engines you want, rent free and what more you ask them." Enclosed with this letter was a full length memorandum giving the history of the patent.

"King William granted Letters-Patent for the use of an Invention for raising water and occasioning motion of all sorts of Mill work by the impellant force of fire, *contrived, invented and found out* by Thomas Savory gent, provided that if it should afterwards appear that such grant is prejudicial or inconvenient to the subjects or that the invention before mentioned is not a new invention and not *invented* and found out by the said Thomas Savory as aforesaid, the said Letters-Patent shall cease and be utterly void.

And the year following Mr. Savory brought a model of his Engine into the House of Commons and obtained an Act of Parliament recit-

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<sup>10</sup> For Newdigate, see Ashton and Sykes, *The Coal Industry of the Eighteenth Century*.

ing the Letters-Patent for a certain new Invention by him, the said Thomas Savory first contrived and found out and that he should have and enjoy the sole use and exercise of the said invention for the further term of 21 years in such manner as in and by the said Letters-Patent is granted or intended.

First note that the Engine for the use of which Capt Savory obtained this patent and Act was a quite different Engine to that now used viz.

- 2nd It was an engine working with Two Receivers in which a strong steam was confined and by letting out that steam into a pipe to any height of water, the steam drove the water up the pipe to any height equal to the strength of the steam and therefore was justly said to raise water by the *Impellant force of fire*.
- 3rd This Engine he set up at York Buildings, Kensington and Castle Bromwich and has showed me the model of it which he carried before the House of Commons and he has sufficiently described it by a Copper plate and another explanation to every member of it in his book called *The Mine(r)s' Friend* and Dr. Harrisses' Lexicon Declinicum and therein declared to be the engine of his invention and how readily the House of Commons granted this Act for his so great an invention upon his producing a model thereof before them.
- 4th This Engine of Mr. Savory's appears to be an engine of a quite different form and working by quite different powers to that now in use, Mr. Savory's engine working only by the *impellant force of fire* and the present engine no wise impelled by fire but wrought by the impellant force of the atmosphere and no otherwise impelled, the fire being only made useful to raise steam which being condensed makes a vacuum for the atmosphere to take pressure upon.
- 1st It may be proved first that the present engine is not comprehended within the words of the patent or act in regard it does not raise water or occasion any motion to any member, part or power thereof by the impellant force of fire, but on the contrary is impelled by the atmosphere only.
- 2nd That the Engine now in use was invented by Monsieur Pappein and others, as I find sufficiently described in their writings from which Mr. Newcomen began to make improvements and to apply for a patent about the year 1710, whereupon Capt. Savory finding he could not make his own engine took Mr. Newcomen in a partner and has taken upon him to supersede Royal authority by giving a sanction to Newcomen's engine under the umbrage of a patent for Savory's engine which was as much a different engine as a Distill is from a Windmill, the

one working by the impellant force of fire and the other impelled by the atmosphere only and not the least imitation of Savory's engine.

- 3rd That the very Engine working with Receivers for which Capt. Savory obtained his Patent was not a new invention, nor the invention of Mr. Savory, but the same was invented by the Marquese of Worcester and described in his book dedicated to the King and Parliament printed in 1663 in P.46, No. 68, wherein he has set forth an admirable and most forcible way (as he calls it) to drive up water by fire and then describes the very Engine which Capt. Savory has in his Copper Plate and which he made use of and obtained the Patent for.
- 4th That Capt. Savory never pretended the Engine now in use to be of his invention but always called it Newcomen's Engine and I find several letters from him under his own hand about the year 1712 wherein he declares it to be so and will have it that his own Engine with Receivers far exceeds Mr. Newcomen's (which is the present Engine) advises me to the use of his own and desires me to inform him of the manner of working the other in several respects and so far was Capt. Savory from being the inventor of this Engine that to his dying day I never could make him understand how that Engine was wrought or to have any opinion of it.
- 5th That the proprietors have forfeited the Indulgence the Government was pleased to allow Capt. Savory for the Marquese of Worcester's engine (allowing that to have been his own invention) in several respects viz.

By Mr. Savory's taking an Invention of Newcomen under the authority of his patent which he has no right to.

By misusing the Patent and making it Prejudicial to the Subjects in insisting on exorbitant rents of £400 per ann. of some, very small rents of £20 per ann. from others who have as great a quantity of water as good collierys, in letting some engines without any rent at all and in refusing others the use of Engines on any terms whatsoever, and in taking considerations from others to grant exclusive covenants not to suffer engines to be erected within certain districts of the kingdom and particularly not within the City or suburbs of London or Westminster except at York Building.

Which unwarrantable practices are highly injurious to [de] fraud many subjects who are not upon an equal footing with others in enjoying the benefit of this Engine."

What weight is to be attached to this heavy indictment

from one who for so long had been so intimately concerned with the patent? In the first place, it undoubtedly strengthens the claim of the Frenchman Papin to be the real inventor of the first steam engine, as French authorities have persistently claimed. On the other hand, the present correspondence makes it clear that Beighton as well as John Calley and Humphrey Potter of Bromsgrove, "the operators" who assisted Newcomen did actually supervise the erection of engines on the Tyne in these years. In a letter dated 3rd December, 1718, Colonel Liddell paid Potter this tribute, "he understands more of the Engine than they all do and will be a useful man to us." So that, Desagulier's claim that it was Potter who invented the self-acting device by which the several valves were opened and shut, may well be true. But what of the episode as a whole?

The course of industrial development has never run smooth. That there were grave abuses in the English patent system in the eighteenth century which hampered industrial development has been known for some time. Some men gathered where they had not sown, others were denied their due reward. That the "Fire Committee" had, in fact, used partiality in the matter of rent for the use of their engines is clear from the articles of contract with Andrew Wauchope the owner of Edmonstone colliery, Midlothian, where the rent was only £80.

Unfortunately the results of the law suit at York and of Parrott's damaging disclosures are not fully known. William Cotesworth, one of the principal partners, among whose papers the present correspondence was found, died in the following year. But three things are tolerably clear: (i) That Sparrow and Parrott agreed to quit their interest in the Park Colliery, Gateshead, which, however, was not "won" for another generation, (ii) that a working engine was installed at Heaton colliery by 1729. "The Fire Engine was set to work on Wednesday last," runs an entry of April 27th, "and performs vèry well, but they are scarce of day water to supply her to make her go so that she's now stand-



ing, but to make good that defect they are laying pumps to pump water from the Burn just where the Engine stands."

(iii) That when the term of the Savory patent was about to expire, in May 1733, Sir Henry Liddell, Bart., and Mr. Wortley, took the precaution of entering a caveat in the appropriate state department against any renewal of it and retained leading counsel to oppose it.